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A RATIONAL METHOD OF SUPPLYING NUTRITION TO PLANTS

/A Digest/

Doctor of Biological Sciences E. I. Ratner has demonstrated the cardinal importance of plant-fertilization conditions in the earliest stages of development of the plant, beginning with germination. The work in question was carried out at the Institute of Plant Physiology imeni K. A. Temiryazev of the Academy of Sciences USSR. In a series of experiments, Ratner showed the great importance of a supply of phosphoric acid, and partly of potassium, in the earliest stage of growth. An increased supply of nitrogen at that stage is not only superfluous, but downright harmful. As soon as the photosynthetic apparatus (leaves) has developed, the nitrogen supply becomes important, however.

Ratner has worked out a fertilization method by means of which the essential elements are supplied to an adequate extent while the originally harmful effect of nitrogen is neutralized. The method is based on the use of an industrial peat-phosphorus-potassium fertilizer of the type developed by the Institute for Fertilizers and Insectofungicides. Such fertilizers comply with all the basic requirements put to fertilizing agents which are introduced into the soil, together with the seeds (neutral reaction, gradual solution, excess of phosphorus over potassium, high content of plant nutrients which permits one to limit the quantity of peat, and presence of a buffer in the form of the organic peat filler). Experiments show that this type of fertilizer is of advantage.

In view of the fact that the fertilizer in question is not yet being supplied by the industry, Ratner recommends the introduction into the soil, together with the seeds, of neutralized superphosphate combined with organic additives prepared on the spot (vegetable composts, peat, humus, sheep or bird dung, etc.). A by-product of the petroleum industry, used gumbrin, may also be used as a filler for superphosphate, and not only locally, but also on an industrial scale.

The first step insuring proper nutrition for the germinating seed is introduction of the fertilizer, together with the seed, into the soil. The second step, which can be accomplished by using a seeder drill combine, consists in the simultaneous introduction of nitrogen-rich fertilizer into a row

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which is dug slightly to one side and deeper with reference to the row of planted seeds. Finally, depending on the availability of fertilizer, these two steps must be combined with basic fertilization carried out with the aid of deep plowing and a subsequent supply of nutrition to the plants during the process of vegetation.

At VNIS (All-Union Institute of Sugar Beets) the coating of sugar beet seeds before planting with the peat-phosphate-potassium fertilizer and azobacterin was investigated. The experiments were carried out on podzol soil and yielded good results.

The Dolgoprud Agricultural Station experimented with clover on a weakly podzolic soil. It was shown in the course of these experiments that separation of a small part of the total doses of phosphorus for introduction, together with the seeds, has a decisive importance for the reproductive process of clover. Similar results with cotton were obtained at the Tadzhik Affiliate of the Academy of Sciences USSR. A considerable increase in the yield of crude cotton was achieved, particularly when the introduction during planting of phosphate, together with the seeds, was combined with supplying additional phosphorus at the very start of flowering.

The first problem of row fertilization, that of supplying readily available phosphoric acid to the seeds immediately after germination, has been satisfactorily solved by using the seeder drill combine and applying Ratner's method. Solution of the second problem, namely, that of assuring a plentiful supply of nitrogen for the young plants during the period of development of the photosynthesizing surface, involves a change in the construction of the seeder drill combine, in the sense that the colter must be deflected in such a manner that proper sowing of the nitrogen fertilizer on the side from the main row and at a greater depth than the main row may be achieved. Another measure consists in the use of granulated fertilizers or, better still, inorganic fertilizers combined with an organic component.

The application of these methods will result in considerably increased yields, while at the same time, a sizeable economy in the use of fertilizers can be achieved.

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